

School Facilities Hazardous Materials Guidelines

**From the
Wyoming Department of Education
and the
Department of Environmental Quality**



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4th Edition

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INTRODUCTION

Pursuant to W.S. 21-2-202 (a)(xxii), the Wyoming Department of Education (WDE) was commissioned to assemble a set of guidelines for the proper and safe storage and disposal of toxic chemicals and other hazardous substances in conjunction with the Department of Environmental Quality (DEQ).

These guidelines also serve to reinforce W.S. 21-3-111 (a)(xix), which requires the board of trustees in each district to, “develop policies...including emergency policies, to minimize risk to students and employees, school property and the environment.”

In addition, the School Accreditation Rules, Chapter 6, Section 15 (b) requires school safety to be addressed. Section 19 (a) includes the need for districts to have policies and procedures that address crisis situations. Hazardous chemicals and materials can compromise school safety and cause crisis situations.

In this document, the term “chemicals” is also used to cover over-the-counter substances such as lubricants, Isopropyl Alcohol, etc. The term “corrosives” can refer to either acids or bases.

It is required that every science/shop teacher and lab assistant be knowledgeable with the chemical safety and safety manual sections at the web site www.uwyo.edu/ehs/.

The WDE strongly encourages districts to coordinate preparedness activities with local emergency planning committees.

Note: This resource is not designed to answer every conceivable question regarding chemical or hazardous materials. If you have an issue that is not addressed - or partly addressed - in these guidelines, please access additional resources including the Department of Environmental Quality at <http://deq.state.wy.us> in addition to the University of Wyoming at <http://www.uwyo.edu/ehs/programareas/chemicalsafety/> and <http://www.uwyo.edu/ehs/programareas/chemicalsafety/chemicalhygienelabsafety.html>

Section I. Definition of Hazardous Waste

- A. Definitions are similar from source to source. The DEQ's definition is relevant because schools with hazardous waste are under its rules.
1. (<http://dictionary.reference.com/browse/hazardous+waste>) Hazardous Waste: A used or discarded material that can damage the environment and be harmful to health. Hazardous wastes include heavy metals and toxic chemicals used in industrial products and processes as well as infectious medical wastes and radioactive materials such as spent nuclear fuel rods.
 2. (<http://www.epa.gov/osw/hazard/>) Hazardous Waste is a waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludges. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes.
 3. ([http://deq.state.wy.us/out/outreachfaq.htm#Hazardous Waste](http://deq.state.wy.us/out/outreachfaq.htm#HazardousWaste)) Hazardous waste is any waste material (solid, liquid, or contained gas) that is discarded by being disposed, burned, incinerated or recycled, and can be classified in one of two categories: 1) listed – the waste is specifically identified and listed in Chapter 2 of the Wyoming hazardous waste rules and regulations (HWRR); or 2) characteristic – if a waste is not listed, it may be a hazardous waste because it is toxic, corrosive, reactive or ignitable, as defined in Chapter 2 of the HWRR.
- B. By definition, if a laboratory chemical or material is determined to be needed, it is not a waste – even though it may still exhibit hazardous properties (corrosive, caustic, acidic, etc.). A chemical that is no longer determined to be necessary to a course curriculum would be considered a hazardous waste if it also meets that classification in the *Wyoming Hazardous Waste Rules and Regulations* (HWRR). These rules also govern how a waste is to be stored. They may be found at the state's DEQ website at: <http://deq.state.wy.us/shwd/I&C/Downloads/compliance.asp>.

Section II. Purchasing Procedures

- A. Hazardous laboratory chemicals should be acquired in the smallest units reasonably possible. This will:

1. Provide for a minimal amount of potentially dangerous material to be stored in the school.
 2. Be less expensive in the long run because there are no disposal costs and no changes in physical characteristics due to materials exceeding their shelf life.
- B. All shipments shall have Material Safety Data Sheets (MSDS) with each new chemical. Do not accept a shipment without these. For older chemicals, an MSDS may be acquired from the manufacturer, supplier, or applicable web site. It is important that emergency services in your area have copies of the MSDS that are used in your school's curriculum. All MSDS on file must be no older than three years.

Section III. On-Site Chemical Management

- A. A chemical is considered hazardous anytime it carries the label of poisonous, dangerous, caution, flammable, or a label that carries a similar message. A school with laboratory chemicals is expected to utilize the MSDS as a part of an overall chemical management plan. (Computerized files alone are insufficient because these would be unavailable if power or computer access was down in an emergency.) Per OSHA, these sheets should list:
1. Chemical names.
 2. Physical and chemical characteristics.
 3. Known acute or chronic health effects.
 4. Exposure limits.
 5. Whether the chemical is a carcinogen.
 6. Precautionary measures.
 7. Emergency and first aid procedures.
 8. Organizations that prepared the MSDS.
 9. The manufacturer's emergency telephone number.
- B. Districts shall not use chemicals that have exceeded the manufacturer's recommended shelf life.
- C. Districts are expected to operate a plan (manual or computer based) for purchasing, storing, effectively managing, and safely using/disposing of hazardous chemicals *to prevent a buildup of unusable or excess chemicals*. There are many software packages available for chemical management.
- D. It is important to have an accurate chemical tracking system to make ordering, dispensing, using, and disposing of hazardous chemicals more fool-proof and to assist in essential removal efforts.

- E. For immediate chemical spill response, it is necessary to be prepared. Each school should have a chemical spill response plan. Response procedures could include, but not be limited to, the following:
1. Evacuation plan to immediately get the students and non-essential personnel out of danger.
 2. Contact person.
 3. Decision tree to determine incidental versus emergency spills (i.e. when to call for outside help).
 4. Emergency response numbers on nearby telephone.
 5. Location of spill equipment.
 6. Map of chemical storage area.
 7. List of who has been trained and authorized for chemical cleanup.
 8. Instructions for Mercury spills – contact the DEQ for recommendations concerning these procedures.
- F. Non-hazardous liquid waste may be dried down – hazardous waste may not. As an example, latex paint may be dried out and placed in the regular trash to facilitate disposal. On the other hand, a substance such as picric acid is highly volatile when dried. Extreme care should be exercised to know what substances pose a danger when dried out.
- G. Chemical wastes awaiting proper disposal should be stored in a separate place and:
1. Not mixed in among virgin stock chemicals.
 2. Not in the classroom.
 3. Not under the hood.
- H. Containers of waste awaiting proper disposal should be:
1. In good condition and not leaking.
 2. Kept closed, except when adding or removing waste.
 3. Labeled to identify what they contain.
 4. Labeled to identify that the content is a hazardous or non-hazardous waste.
 5. Stored only with compatible wastes.
 6. Stored inside and protected from freezing.
 7. Coated in plastic, if made of glass.
 8. Limited to $\frac{3}{4}$ full to allow for expansion.
- I. Avoid mixing hazardous and non-hazardous wastes.

- J. For the safety of first responders, the front office should always have a current copy of the MSDS. Also, chemistry teachers are advised to let the front office know when they are doing experiments with flammable or reactive chemicals.

Section IV. Chemical Storage

- A. The chemical storage area in a school should be separate and secured from other areas and should be off limits to students and shall comply with 2012 IFC, Chapter 50 Hazardous Materials – General Provisions, and the 2012 IBC (or latest IBC) where applicable.
- B. Shelving sections should be secure and equipped to prevent items from rolling off the shelves.
- C. Cabinets shall comply with provisions of the 2012 IFC and be listed and approved for their intended use.
- D. Other basic storage rules:
1. All cabinets, containers, or shelving shall be labeled to identify hazardous materials utilizing the National Fire Protection Association (NFPA) 704 marking system.
http://en.wikipedia.org/wiki/NFPA_704.
 2. Acids and flammable materials should each have their own special storage cabinet.
 3. Oxidizers should be stored away from flammables.
 4. Each storage area shall be equipped with smoke detectors.
 5. An approved eye wash station and fire blanket shall be located within 25 feet of the hazardous materials storage area.
 6. Spill control materials (neutralizing agents, dry sand, and Solusorb or equivalent) shall be readily available.
 7. Storage areas shall be free from possible ignition sources.
 8. Emergency telephone numbers shall be posted in the chemical storage area, including the “Poison Control Network” number (1-800-222-1222) and a nearby/regional first responder number. A telephone and emergency first-aid supplies should also be located close by.
 9. Peroxide-forming chemicals should be stored in an airtight container in a cool, dark, dry place and be properly disposed of 12 months after opening.
 10. Chemicals should be divided into their chemically compatible families and then stored alphabetically within that compatible family.

Section V. Chemical Inventory Procedures

A. Prior to the inventory:

1. Have a qualified chemical expert present during all planning and operational aspects of the inventory. Never perform a chemical inventory alone.
2. Never involve students in the inventory. Conduct the inventory at a time when the fewest students are in the building.
3. Advise emergency personnel (fire department and police department) prior to performing a chemical inventory. It is even an option to include them in the inventory.
4. Use appropriate personal protective equipment and map out an escape route.
5. Consult the UW safety manuals or websites. Have a sound understanding of the procedure before starting.

B. Performing a chemical inventory:

1. Avoid touching or moving containers that may contain shock sensitive chemicals. Old chemicals may have grown unstable. There are many chemicals that lose stability with age and become explosive if suddenly moved or jarred. If questions exist about the shock sensitivity of a particular material, consult with a chemical expert or call the fire department, the University of Wyoming, or the DEQ for help.
2. Confirm the presence of an MSDS for each chemical.
3. A staff person should record for each chemical:
 - a. Date of purchase and recommended shelf life.
 - b. Date of last inventory inspection.
 - c. Quantity on hand at the time of the last inventory inspection.
 - d. Current quantity or amount of material (include units).
 - e. Size of container.
 - f. Type of container (metal, plastic, glass, gas cylinder, etc.).
 - g. Assigned storage space.
4. Note key characteristics where appropriate, i.e. percent of solid versus liquid, presence of crystals on lid or inside bottle, presence of and percent of emulsion oil covering metal salts, presence of paraffin coating around lid, unexpected viscosity, unexpected content color, etc.

5. Decide what must be disposed:
 - a. Determine the hazardous characteristics and storage requirements for each chemical.
 - b. Identify all chemicals that are unneeded or have an expired shelf life. See what chemicals are not required by the current curriculum. A good general rule is all chemicals not used within a three-year period should be removed from storage and disposed of using proper removal procedures.
 - c. Identify all chemicals that are unstable, shock sensitive, explosive, highly toxic, or carcinogenic.
 - d. Utilize state, district, or community resources as available to properly remove the chemicals from the school campus. If necessary, contact the DEQ for waste storage and disposal requirements.
6. If hazardous chemicals are shown to be missing:
 - a. Double check your results.
 - b. If possible, check with previous records to establish the time frame the chemicals left the storage area.
 - c. Contact your school principal and district superintendent.
 - d. Contact your local police.

Section VI. Hazardous Material Disposal Options

- A. The district may remove hazardous material through district written contracts with a licensed provider with either no state aid, or with state aid when it is available.
- B. Some communities provide one-day collection events where “hard to dispose of” materials can be taken on an infrequent basis. Contact your local city government for information. This will not necessarily be available in all communities.
- C. At this time, there are three permanent hazardous waste collection facilities in the state. They are:
 1. City of Casper 307-235-8246
<http://www.casperwy.gov>
 2. City of Cheyenne 307-637-6440 ext. 0
www.cheyennecity.org

3. City of Jackson 307-733-7678
www.tetonwyo.org/recycling

Rules regarding what hazardous materials are received vary from site to site and are subject to change without notice. Some may have restrictions on accepting hazardous material from only adjacent counties.

- D. Federal grants are sometimes available which are aimed at funding the cleanup of toxic waste.
- E. The Wyoming Department of Agriculture (307-777-7321) has historically had funding available to assist organizations in disposing certain types of pesticide waste. Annual fluctuations and budget cuts may affect the availability of these funds.
- F. The Regulated Materials Management Center (307-766-3698) at the University of Wyoming can give advice and list vendors. On rare occasions they can accept small amounts of Uranium.
- G. Contact the manufacturer listed on the MSDS for disposal procedures.

Section VII. Accident Prevention

- A. All districts are expected to:
 - 1. Ensure that applicable teachers, instructors, and aids are trained in lab safety procedures.
 - 2. Ensure that students are trained in lab safety and ensure that lab participants know that they are responsible for their own actions and for following all applicable safety procedures.
 - 3. Use as little flammable or ignitable liquid as possible in a lab, and only when absolutely necessary.

Note: If a flammable or ignitable liquid must be used, make absolutely certain that there is qualified supervision present and that there is an adequate airflow to exhaust combustible fumes to ensure they do not collect in the experiment area. Verify that applicable hoods, fans, or other air moving means are available and in good working order.

- B. Alternative materials can often be substituted in the place of hazardous chemicals while teaching the same principle.

- C. Videos are sometimes available via the web or from external providers. They can also be produced in-house depicting a given experiment. This would require the experiment be conducted only once.
- D. In certain situations involving highly flammable fluids or extraordinarily corrosive chemicals, a detailed walk-through may be conducted in place of direct student involvement.
- E. Micro-scale techniques can often be utilized.
- F. A “restricted use” policy can be imposed regarding select chemicals.
- G. The chemicals proven most dangerous can be removed from the school entirely.
- H. It is critical that the staff involved with the use of chemicals keep informed of how some chemicals become very dangerous when stored for long periods of time. One example of a resource that highlights accidents that can be avoided is the article *Management of time sensitive chemicals (I): Misconceptions leading to incidents*: <http://pub.extranet.fsu.edu/sites/safety/safetywiki/Wiki%20Documents/Management%20of%20Time%20Sensitive%20Chemicals%201.pdf>

Section VIII. Non-hazardous Disposal

- A. For questions regarding materials that may be safely disposed through standard means, contact your nearest waste-water treatment plant or the DEQ’s Solid and Hazardous Waste Division at 777-7752.
- B. Liquid chemicals in any form are prohibited from being disposed into state landfills.

Web References

There are several web sites that promote specifics related to hazardous materials and lab safety:

<http://siri.org/msds>

<http://www.labsafety.org>

<http://www.flinnsci.com>

<http://hazard.com/msds>

<http://www.uwyo.edu/ehs/>

<http://www.uwyo.edu/ehs/programareas/chemicalsafety/>

<http://www.uwyo.edu/ehs/programareas/chemicalsafety/chemicalhygienelabsafety.html>

http://www.indiana.edu/~cheminfo/ca_csti.html

<http://www.uschemicalstorage.com/regulations.html>

<http://www.chemicalsafety.com/>

http://www.epa.gov/opp00001/factsheets/health_fs.htm

<http://www.hometrainingtools.com/articles.asp?ai=1020&bhcd2=150702017>

<http://www.casperwy.gov>

www.cheyennecity.org

www.tetonwyo.org/recycling

<http://deq.state.wy.us/shwd/>

<http://www.epa.gov/waste/hazard/generation/sqg/handbook/insert.pdf>

<http://phmsa.dot.gov/hamat/erg2012>

<http://static.dpsk12.org/gems/bonds/2008ChemicalManagementPlan.pdf>

<http://deq.state.wy.us/shwd/I&C/Downloads/compliance.asp>

http://deq.state.wy.us/out/outreachfaq.htm#Hazardous_Waste

APPENDIX A

The hazard.com, uwyo.edu, and siri.org web sites can be used to locate an MSDS if one is not available from the manufacturer or supplier.

A chemical is not defined as a waste until the waste generator determines that it is (i.e. no longer has a use, outdated, etc.).

A school environment generating greater than 2.2 pounds per month of any P-listed chemical (see the Department of Environmental Quality's web site for a list of P-chemicals at <http://deq.state.wy.us/shwd/>) is classified as a Large Quantity Hazardous Waste Generator (LQG), and is therefore subject to the LQG Wyoming hazardous waste generator requirements.

The Denver Public Schools Laboratory Hazardous Materials & Chemical Management Plan has three helpful Appendices at:
<http://static.dpsk12.org/gems/bonds/2008ChemicalManagementPlan.df>.

Appendix A	Prohibited chemicals in the lab.
Appendix B	Restricted (demonstration only) chemicals in the lab.
Appendix C	Red Flag chemical list (oxidizers, poisons, reactive to water or air, carcinogens, those that cause ozone depletion, and those that can cause fire or explosions).

The *2012 Emergency Response Guidebook* can for quick chemical property identification and hazards. It is divided into four sections. (It is available on line at <http://www.phmsa.dot.gov/hazmat/erg2012>, within the site, go to "Current ERG (PDF)".)

Yellow Bordered Pages: Shows the index list of dangerous materials in numerical order.

Blue Bordered Pages: Index list of dangerous materials in alphabetical order.

Orange Bordered Pages: Safety recommendations.

Green Bordered Pages: Water reactive materials.

APPENDIX B

Make the best effort to keep in mind the broad category of properties to which a chemical/substance belongs during the purchase, inventory, storage, usage, and final disposal of a material. Using such a system can help re-enforce knowledge of characteristics of these categories throughout the management/handling chain of purchasing, inventory, storage, use, and disposal. Examples of categories and some specific materials include but are not necessarily limited to those below:

1. Stable inorganic salts (sodium chloride, potassium sulfate, etc.)
2. Toxic/poisonous inorganic salts (lead chloride, cadmium sulfate, etc.)
3. Unstable or reactive (with water, acids, caustics or air) inorganic Salts (aluminum chloride, many metal sulfides, etc.)
4. Weak acids (phosphoric acid, etc.)
5. Strong mineral and/or reactive acids (nitric acid, perchloric acid, etc.)
6. Weak bases/caustics (calcium hydroxide, etc.)
7. Strong bases/caustics (sodium hydroxide, etc.)
8. Stable elements (iron, copper, etc.)
9. Toxic/poisonous elements (arsenic, lead, etc.)
10. Unstable and/or reactive elements (elemental sodium, potassium, phosphorous, etc.)
11. Stable, non-flammable organic chemicals/solvents (mineral oil, paraffin, etc.)
12. Stable but flammable organic chemicals/solvents (naphtha, petroleum ether, hexane, etc.)
13. Unstable, toxic/poisonous and/or reactive organic chemicals/solvents (organic peroxides, many ethers, etc.)